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DESCRIPTION OF THE ADULT OF *EPHEMERELLA BERNERI* ALLEN AND EDMUNDS (EPHEMEROPTERA: EPHEMERELLIDAE) WITH BIOLOGICAL NOTES

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Abstract.—The adult of *Ephemerella berneri* Allen and Edmunds is described for the first time. Male genitalic characters ally this species with *Ephemerella needhami* McDunnough. Notes on the biology and distribution of *E. berneri* are also given.

Ephemerella berneri was described by Allen and Edmunds (1958) from larvae collected in Georgia and Virginia. The adult has remained undescribed (Allen and Edmunds, 1965). We recently found large populations of *E. berneri* larvae in several 5th and 6th order streams in southwestern Virginia. In order to describe the adult, we reared several larvae in the laboratory.

Ephemerella berneri Allen and Edmunds

Male imago (in alcohol).—Body length 12 mm, forewing 10.5 mm. Head predominantly black; clypeus white; antenna black; upper portion of compound eye red, lower portion orange. Thorax black; anterior lateral faces of scutum yellow; areas anterior to mesocoxa yellow; pleural membranes tan; sterna black. Foreleg black, mid- and hindlegs white; all coxae tan. Wings hyaline with longitudinal veins brown; costal area of forewing tinged with tan. Abdominal terga 1–8 chestnut brown, with pale transverse band near posterior margin of each segment; terga 9–10 black; abdominal sterna tan. Penes without spines (Fig. 1), having long apical lobes with a deep median notch; dorsal surface black; ventral surface white. Genital forceps white with 2nd segment expanded apically (Fig. 1) and edged with black. Caudal filaments white with dark brown articulations.

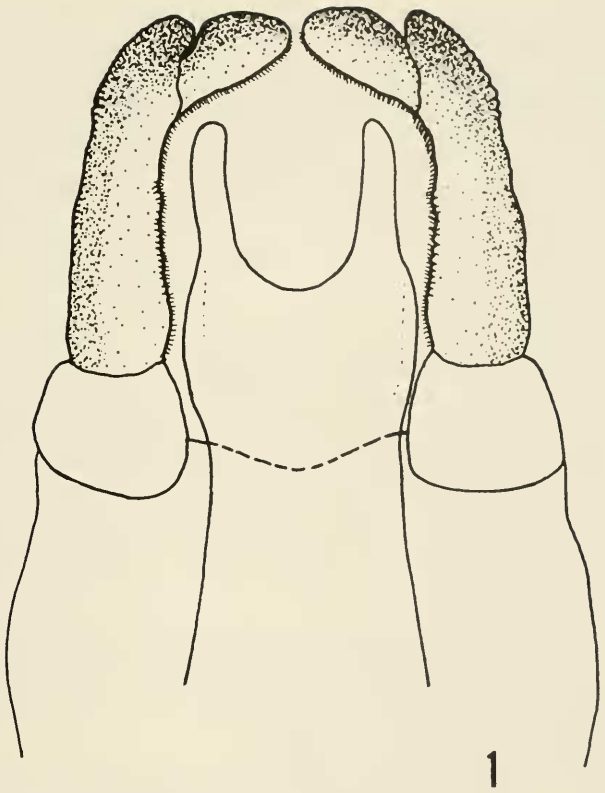

Fig. 1. *Ephemerella berneri*, dorsal view of male genitalia.

Female imago (in alcohol).—Body length 12 mm, forewing 10.5 mm. Maculation somewhat paler but very similar to male.

Material examined.—Smith River, County Route 674, Henry Co., Virginia, B. C. Kondratieff, 7♂ imagos, 3♀ imagos (reared), emerged 7 May 1980 from larvae collected 26 April 1980; Little River, County Route 787, Montgomery Co., Virginia, B. C. Kondratieff, 1♀ imago (reared), emerged 19 May 1980 from larvae collected same day. All deposited in the VPI & SU Collection.

Remarks.—*Ephemerella berneri* is allied to *Ephemerella needhami* McDunnough in the structure of the male genitalia. Both species have penes with long apical lobes and a deep median notch and lack penal spines. *Ephemerella berneri* can be readily distinguished from *E. needhami* by having the second segment of the genital forceps with an apical expansion and by the striking color pattern of the imago. Males of *E. berneri* can be iden-

tified using the key on page 249 in Allen and Edmunds (1965), with the following modifications:

8(7). Penes without spines 8A
– Penes with dorsal and/or median spines; 2nd segment of genital forceps with a slight apical expansion 9
8A(8). Second segment of genital forceps without apical expansion ..... *needhami* McDunnough
– Second segment of genital forceps with apical expansion ..... *berneri* Allen and Edmunds

Biological notes.—*Ephemerella berneri* larvae were collected from thick mats of *Podostemum ceratophyllum* (Michaux) (river weed) on rocks in riffle areas. Larvae were common in several 5th and 6th order rivers in the Ridge and Valley and Piedmont physiographic provinces of Virginia: New River (Montgomery and Carroll Cos.), Little River (Montgomery and Pulaski Cos.), and Smith River (Henry Co.). Larvae were especially abundant in the Smith River below Philpott Reservoir, averaging 210 larvae/m². This site is approximately 5 km below Philpott Dam, a deep release reservoir. The substrate is characterized by exposed bed rock, coarse pebble (32–64 mm), and some cobble (64–256 mm) covered by a thick carpet of riverweed during the warm months. According to Virginia Division of Water Resources (1975) mean annual water temperature at this site is 11.7°C. Dissolved oxygen concentration averages near saturation (93%) and the water exhibits circumneutral pH (range 6.7–7.8, average 7.0).

Subimagoes of *E. berneri* emerged from early afternoon to early evening (ca. 2:00–8:00 PM). Full-grown larvae floated to just below the surface of the water in areas of moderate current and then emerged instantaneously. Water temperature at the time of observed emergence was 13.9°C. Other mayflies associated with *E. berneri* were *Ephemerella invaria* (Walker) and *Serratella serratoides* (McDunnough).

Ephemerella berneri was also common in the Ocoee (Toccoa) River, Georgia, above and below Blue Ridge Reservoir. Here larvae were associated with *Fontinalis* sp. (watermoss) or tangles of exposed roots of riparian vegetation.

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